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TITLE: SYSTEM AND METHOD FOR MAPPING TEXTURES ONTO SURFACES OF COMPUTER-GENERATED OBJECTS

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CERTIFICATE OF MAILING

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PRELIMINARY AMENDMENT

Sir:

Please enter the following amendments before examination of this application:

Sub C1 A1

1. (Once-Amended) A method for mapping a texture onto a surface of a computer generated object comprising the steps of:

approximating a true pixel color by performing a number of texturing operations [according to], said texturing operations being determined by a geometric shape of a projection of a pixel on the texture; and

averaging results of said texturing operations.

2. (Once Amended) A method as set forth in claim 1, wherein each of said texturing operations comprises:

accessing a mip[-]map at least one time; and

responding to multiple accesses being performed by, interpolating [of] results [if multiple accesses are performed] of the accesses.

4. (Once Amended) A method as set forth in claim 3, wherein said number of texturing operations is [limited] less than or equal to a predetermined limit.

5. (Once Amended) A method as set forth in claim [4] 2, wherein the texture represents [at least one of texture and] a reflected environment [is mapped onto the surface].

6. (Once Amended) A method as set forth in claim [4] 2, further comprising modifying a specularly reflected light intensity on the surface by [one of multiplying and otherwise] combining said specularly reflected light intensity with a specular reflectance coefficient, said specular reflectance coefficient being retrieved from a specular reflectance coefficient map associated with the surface.

7. (Once Amended) A method for modifying a specularly reflected light intensity on [the] a surface of a computer generated object, comprising [the steps of]:

[one of multiplying and otherwise] combining the specularly reflected light intensity with a specular reflectance coefficient, said specular reflectance coefficient being retrieved from a specular reflectance coefficient map associated with the surface.

8. (Once Amended) A method for adding detail to a texture map comprising at least one texture element, the method comprising the steps of:

generating a detail map; and

assigning a pointer into said detail map to [each] at least one of the texture [element] elements of the texture map to generate a pointer map, said pointer comprising two offsets.

10. (Once Amended) A method as set forth in claim 9, further comprising the steps of:

determining a texture address and a level of detail [for each pixel];

responding to said level of detail indicating that detail is needed by, retrieving[, if detail is needed as indicated by said level of detail,] offsets from said pointer map;

using said offsets as detail map addresses;

accessing said detail map[at least one time];

responding to multiple accesses of the detail map by, interpolating results of the detail map accessing [if multiple accesses are performed]; and

mapping the texture map[s] and the detail map[s on] to a surface of a computer generated object.

11. (Once Amended) A method as set forth in claim 10, wherein a final pixel color is a combination of [a] the results of [a] the detail map[ping] access operation and a texture map[ping] access operation, said texture map[ping] access operation comprising at least one access to the texture map[and subsequent interpolation of the results of said texture map accessing if multiple accesses are performed].

12. (Once Amended) A method as set forth in claim 11, wherein at least one of said texture map[ping] access operation, [environment mapping, reflectance mapping] and said detail map[ping] access operation is carried out in real time using dedicated arithmetic units.

13. (Once Amended) A device for generating [at least one of] a texture map [mapping], environment map [mapping], reflectance [mapping] map and detail [mapping] map, comprising:

[a dedicated arithmetic unit; and]

a memory unit[s] for storing at least one of a texture map, an environment map, a reflectance map, and a detail map[s]; and

a dedicated arithmetic unit, responsive to said memory unit, for generating at least one of said texture map, environment map, reflectance map, and detail map.

15. (Once Amended) A device for mapping [at least one of non-interlaced and] interlaced real time video images onto a surface of a computer generated object, each video image including two interlaced half-frames of pixels, comprising[;] :

a filter unit for generating prefiltered images of less detail; and

means for accessing pixels of a previous interlaced half-frame to perform said filtering.

16. (Once Amended) A method for mapping a texture onto a surface of a computer generated object represented by a plurality of pixels, comprising the steps of :

dividing a texture map into blocks, the texture map comprising a plurality of texels, each texel having an associated value;

determining two block values for each block, which block values are representative of the values of texels in the block;

compressing [a] the texture map [using blockwise two-level (one bit) quantization of brightness values or colors] by assigning to each texel one of the block values associated with the block of which it is part; and

[mapping said compressed texture map on a storage medium; and]

mapping said [stored] compressed texture map [into] onto the surface of [a] the computer generated object.

17. (Once Amended) A method as set forth in claim 16, wherein [resulting colors of an entire compressed texture are again quantized to one of a smaller number of bits and 8 bits] the block values associated with the texture map are quantized to a smaller number of bits.

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18. (Once Amended) A method as set forth in claim [17] 16, wherein [said two-level quantization step] the step of determining two block values for each block comprises:

calculating a tensor of inertia from [input] texel values;

determining an eigenvector having a smallest eigenvalue from said tensor;

multiplying said smallest eigenvalue eigenvector with said [input] texel values; and

splitting the [input] texel values in two groups by comparing a result of said multiplication with a threshold value.

19. (Once Amended) A method as set forth in claim [18] 16, [further comprising the steps of:] wherein the texture map corresponds to a filtered texture map of lesser detail than a texture map of full detail.

[generating filtered textures of less detail; and

compressing said filtered textures.]

20. (Once Amended) A method as set forth in claim [19] 16, wherein the step of [said texture mapping operation] mapping said compressed texture map onto the surface of the computer generated object comprises:

for each pixel which represents the computer generated object,

[one of] accessing [one of] said compressed texture map [and said filtered texture map] at least one time; and

responding to said compressed texture map being accessed more than one time by, interpolating results of the accesses [if one of said compressed texture map and said filtered texture map is accessed a plurality of times].

21. (Once Amended) A method as set forth in claim 20, wherein the step of [said texture mapping operation] mapping said compressed texture map onto the surface of the computer generated object further comprises approximating true pixel color by performing a number of texturing operations according to a geometric shape of a projection of a pixel on the texture and averaging results of said texturing operations.

22. (Once Amended) A method as set forth in claim 21, [further comprising mapping at least one of a texture, environment, reflectance and detail maps onto the surface] wherein the texture is an environment map.